

Personal Barriers to Diabetes Care: Lessons from a Multi-ethnic Community in New Zealand

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The aim of this study was to identify and quantify barriers to diabetes care perceived by diabetic subjects from a multiethnic, urban community (mainly New Zealand Europeans, Maori, and Pacific Islanders). A qualitative survey including 57 diabetic subjects and health care providers from a diverse range of backgrounds was followed by a cross-sectional household survey. Barriers to care were quantified among 1862 (2.1 %) diabetic residents of a total surveyed population of 90 477. Thirty barriers to care categories were generated incorporating patient beliefs, internal and external physical barriers, educational, psycho-social and psychological barriers. In spite of major difference in culture, acculturation, and socio-economic status, the top 10 barriers were similar between the ethnic groups. The most important barriers were perceiving that the benefits of self-care were outweighed by the disadvantages (20 % Europeans, 20 % Maori, 29 % Pacific Islanders, 16 % others, $p < 0.001$), lack of community-based services (13 % Europeans, 27 % Maori, 25 % Pacific Islanders, 11 % others, $p < 0.001$) and the limited range of services available (15 % Europeans, 22 % Maori, 20 % Pacific Islanders, 14 % others, $p < 0.05$). It is postulated that definition of these barriers, with subsequent, systematic action to reduce their impact, in both patients and populations could result in an improvement in diabetes outcomes. © 1998 John Wiley & Sons, Ltd.

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Introduction

Many of the reasons for quality diabetes care not to be implemented are related to the organization of the diabetes services and are being addressed through improvements in information technology, audit, guideline development, and quality circles.^{1,2} However, 'barriers to care' related to the experiences and perceptions of patients remain poorly defined and unstructured. These barriers to care range from those that are specific for particular communities and individuals to others that cross the boundaries of gender, culture, nation, and ethnicity. The impact of such barriers may also vary, and this is reflected by ethnic differences in the level of diabetes control and rates of complications.^{3–5}

New Zealand Maori and Pacific Islands people (mainly from Western Samoa, Tonga, Cook Islands, Niue) experience high rates of diabetic complications.⁵ An urgent need to control diabetes has been identified in South Auckland, where one-third of the 303 000 residents are either Maori or Pacific Islands people. A plan for the

prevention of diabetes and its complications is currently being implemented.⁶ The South Auckland Diabetes Project was established to address the need for baseline and ongoing information and to pilot and implement a primary prevention programme for Type 2 diabetes using a community development model.⁷ A foundation for both strategies was a door-to-door survey. It has helped in validating methods for routine monitoring of diabetes⁸ and overcome enumeration problems associated with national census data.⁹ It has also helped identify, influence, and train members of the high-risk communities and those with diabetes, thereby increasing local support for the primary prevention and diabetes support programmes.

This paper describes and substantiates the perceived barriers to care in inner urban South Auckland using a novel, combined qualitative and epidemiological approach. An anthropological study was used to define, qualitatively, the domain of potential barriers for patients from both patient and health worker perspectives. The frequency of these barriers were determined using the door-to-door survey. The anthropological survey was expected to obtain more in-depth comments, but the relative importance of these comments in the community were expected to be obtained from the more superficial, but quantitative, door-to-door survey.

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Research Design and Methods

The anthropological study and door-to-door surveys were undertaken concurrently.

Household Survey

Between April 1992 and August 1995, the locally recruited, multiethnic team of the South Auckland Diabetes Project visited all households in inner urban South Auckland (Otara, Mangere, Papatoetoe and Otahuhu). The area includes some of the most socio-economically disadvantaged urban districts in New Zealand. Diabetes care is delivered by general practitioners (GPs) who can refer to either a hospital clinic or a community-based clinic with Maori and Pacific Islands community educators. A team of research assistants recruited from the local community and reflecting the local ethnic diversity conducted interviews. Age, sex, ethnic self-identify, and known diabetes status were requested from all residents (defined as living in a house for 4 months or longer).^{8,9} Those with diabetes were asked to complete a questionnaire including diabetes history, occupational and educational status. Standardized questions were asked in relation to whether and why they were worried about their diabetes, how they would improve local diabetes services, and what they believed prevented themselves or others from looking after their diabetes 'properly'. Additional non-directed statements were also recorded and subjects were asked for any further comments at the end of the interview. Responses were written directly onto the questionnaires and more than one response was often given to a question. Each response was given a 'response code' to facilitate analysis (maximum 3 response codes per complete response for a given question, e.g. a complete response may be transport, finance and obtaining a babysitter, this would generate three response codes: transport, finance, and babysitter problems).

Anthropological Survey

Fifty single or group, in depth, semi-structured interviews were undertaken among health workers and diabetic patients selected through the local diabetes services, rural and Maori health worker networks and community workers involved with the South Auckland Diabetes Project. Subjects were selected to ensure a range of age, socio-economic, ethnic groups and health workers in order to provide a multifaceted view of issues surrounding diabetes care. Interviews were tape-recorded and averaged 45 min in length. Subjects were encouraged to speak at length about aspects of diabetes care and their personal experiences. The sample included three focus groups (Maori community/hospital workers (3 subjects); general practitioner group (4 subjects); European diabetic patient group (5 subjects)) and 47 single interviews (including 2 of the Maori workers in a focus group).

Health workers ($n = 25$) included diabetes and medical specialists, diabetes nurse specialists (1 with diabetes), practice nurses, Maori nurses, the local Maori cultural advisor, Pacific Islands and Maori community diabetes educators, GPs and polytechnic lecturers on the local community diabetes educator course. The rest of the subjects were either European, Maori, Pacific Islander or Chinese diabetic patients or their care givers. Within the sample of 57 subjects, 21 % were male, 47 % were European, and 35 % were unemployed or retired. The mean age was 50 ± 11 years. Among those with diabetes, 31 % were treated with insulin.

Dialogue was analysed to generate specific barriers to care categories using the qualitative computer software package, NUD*IST, which is 'designed to aid researchers in handling Non-numerical, Unstructured Data by supporting processes of Indexing, Searching and Theorizing'.¹⁰ NUD*IST helps to create a more objective database for analysing text including subjective judgments regularly made in qualitative analysis. Factors targeted included the impact of diagnosis, symptoms, and treatments on patients and their families, lifestyle decisions and choices, and perceptions of barriers to care from both service user and service provider.

Validation of Barrier Categories

Face validity¹¹ for the barriers identified by the anthropologists (TW, AP) from the in-depth interviews was provided by a two-step process. After an independent critique of the identified barriers was undertaken by the community psychologist (JV) and physician (DS), a final consensus was then obtained by a combined review. The list of barriers developed from the anthropological study was then applied to the household survey data. The individual response codes for the household survey responses often represented a number of barriers and it was necessary to allocate one or more barriers to each of these response codes. Again, a two-step discussion and decision-making process was applied whereby the community psychologist and anthropologist (TW) independently allocated barriers followed by a combined review. Allocation of barriers depended on unanimous agreement and no adjudication was necessary.

The validity and reproducibility of the multiple barriers allocated to the household response codes was assessed by randomly selecting one hundred questionnaires, allocating barriers directly to the complete response and then comparing the frequency of these barriers with those independently allocated using the multiple response codes. Internal validity of the results was assessed by comparing the frequency of barriers for the three direct questions with and without the response codes from the open comments.

Statistical Analysis

Local Ethics Committees approved all surveys. Data were analysed using SPSS for Windows (SPSS Inc., IL, USA).

For the purposes of these analyses, those self-identifying as an ethnic admixture (e.g. European–Maori, European–Pacific Islands) were grouped with the non-European groups. The distribution of barriers during the validation exercise was compared using χ^2 test. The variable number of barriers identified with each question made kappa¹² difficult to use for assessing the amount of agreement within subjects. Where there was a discordant number of barriers identified, unmatched barriers were matched with a 'dummy' barrier to ensure a similar range of barriers in the two allocation methods. This allowed kappa to be calculated. Chi-squared (χ^2) with continuity correction was used to compare proportions. Multiple analysis of variance was used to provide marginal means adjusted for covariates. All tests were two-tailed with $p < 0.05$ taken as significant. Logistic regression was used to determine significant associations between putative barriers to diabetes care and covariates. Sex, current insulin treatment, whether they were in receipt of payments ('receiving a benefit'), education to post-secondary school level, and ethnic group were entered as categorical variables into both forward step-wise and forced entry logistic regressions with each barrier entered as the dependent variable. Age and diabetes duration were entered as continuous variables. Only variables entering both regressions with a significance level ≥ 0.05 have been reported.

Results

Household information was available from 25 039 (91.3 %) of the 27 419 occupied residences. Known diabetes was reported by 1862 (2.1 %) of the 90 477 residents. Incomplete data were available for 19 diabetic subjects identified in non-participating houses. Table 1 shows the characteristics of the diabetic subjects enumerated in the door-to-door survey. There were no ethnic differences in the proportion that had attended a diabetes clinic (59 %). Those of combined Maori/Pacific Islands

descent have been excluded from analyses as only 5 had diabetes.

Barriers to care

Thirty specific patient-identified barriers to care were identified (Table 2). Each of these barriers to care themselves comprised a range of issues (e.g. language barriers included the need for translated educational materials as well as for interpreters during a consultation). The 30 barriers to care were grouped into 5 different aspects:

1. psychological (including 'beliefs' held by the individuals;
2. their current general and specific 'knowledge' of their situation;
3. their internal physical barriers to care;
4. community barriers to care;
5. psycho-social barriers to care.

Validation of the Barriers to Care

Diabetic subjects within the household survey generated 458 codes relating to concerns and barriers to care. The median total number of response codes was 2 (interquartile range 1–3). A higher proportion of Maori (46 %) and Pacific Islands people (43 %) provided 3 or more response codes compared with Europeans (33 %) and Others (30 %) ($p < 0.001$). The number of response codes given correlated inversely with age among Europeans ($r_s = -0.23$, $p < 0.001$) but not other ethnic groups. Among the 100 subjects randomly selected for validation, the frequency of barriers was similar whether coded separately or directly ($\chi^2 = 18.87$, $DF = 30$, $p > 0.9$). The amount of agreement between these two methods was acceptable (kappa = 0.82).

Non-directed comments increased the number of barriers reported by 10.1 %. Inclusion of non-directed

Table 1. Characteristics of responding diabetic patients

	European	Maori	Pacific Is	Other	Significance
Number enumerated	26 676	17 580	38 923	6058	
Number with diabetes	609	438	692	118	
Number (%) completing interview	546 (89.7 %)	376 (85.8 %)	600 (86.7 %)	94 (79.7 %)	
Age (yr)	62 (61–63)	51 (49–52)	52 (51–53)	51 (48–54)	0.001
Female	52 %	59 %	60 %	48 %	0.05
Further education	25 %	19 %	18 %	25 %	0.05
Beneficiary ^a	26 %	34 %	24 %	29 %	0.01
Speak English at home	97 %	92 %	30 %	18 %	0.001
Years in New Zealand	53 (51–55)	50 (49–51)	20 (19–21)	11 (9–14)	0.001
Duration of diabetes (yr)	10 (9–11)	9 (8–10)	8 (7–8)	9 (6–11)	0.01
Age at diagnosis (yr)	52 (51–54)	42 (41–43)	45 (43–46)	44 (40–47)	0.001
Insulin treated ^b	22 %	19 %	15 %	19 %	0.05

^aThose reporting receiving a sickness benefit, unemployment benefit or pension. In New Zealand, benefit entitlement depends upon the benefit status of the partner.

^bTreated with insulin currently, with or without oral medication.

Categorical variables are compared using χ^2 and continuous variables by analysis of variance.

Table 2. Barriers to care: (a) psychological, educational, internal physical, and external physical; (b) psycho-social

Barrier	Description (examples)
(a)	
<i>Psychological</i>	
Western health belief	Believe science/professionals should find a cure/do more
Spiritual health belief	Believe cause/cure should be sought spiritually/within
Alternative health belief	Prefers uses alternative health models/treatments
Public health belief	Believes the public should bear more financial responsibility for health care
Self factors – motivation	Psychological – motivation, attitudes, 'laziness', denial
Self factors – self-efficacy	No confidence, external locus of control, low self-efficacy
No symptom cue	No physical symptoms
Priority setting	Others needs priority over own (e.g. children, elders)
Negative perceptions of time	Not enough time (education provided too quickly)
Emotional	Fear, shame, emotion, anxiety, worry
Precontemplative	Strictness of the regimen, giving up things I enjoy
<i>Educational</i>	
Low diabetes knowledge	Lacks general/specific diabetes knowledge
Low knowledge of services	Unaware of services available
<i>Internal physical</i>	
Self factors/other health conditions	Diabetes (e.g. amputation) and non-diabetes related (e.g. arthritis)
Physical effects of treatment	Pain of glucose monitoring, drug side-effects
<i>External physical</i>	
Personal finance	Income in relation to costs
Service/physical access	Transportation, wheelchair entry
Limited range of services	Timing or format of services (e.g. evening clinics, home visits)
Appointment system/staffing levels	Insufficient staffing for adequate service
Lack of community-based services	No local clinic that is identified as 'own'
Unhelpful health professionals in past	Past encounter with health professional leading to conflict or without expected communication or clinical expertise
(b)	
<i>Psycho-social</i>	
Unsatisfactory/inappropriate diabetes care or education	Wrong information provided or information provided in inappropriate way
Group pressure	Pressure from others not to adhere to advice
Prejudice (not reported in household survey)	Impression of discriminatory practice due to diabetes or for other reasons
Lack of public awareness of diabetes	Others behave without adequate knowledge or acceptance of diabetes
Lack of family support	Family consumes diabetic food, resists change of lifestyle
Family demands	Pressure to spend time/money on the family rather than their diabetes
Unsupportive macroenvironment	Feeling of lack of support in the community, e.g. access to low fat foods
Communication	Language differences (translation)
Inappropriate cultural messages	Attitude, ethnicity of workers, appropriateness of communication

comments increased the frequency of 6 barriers to care by over 20 %: alternative health belief (by 69 %), language (by 52 %), other health conditions (by 51 %), low knowledge of services (by 51 %), unhelpful health workers in the past (27 %), and lack of family support (by 20 %). Addition of responses within the comments section did not change the ranking of the 10 most frequent barriers among Europeans, Maori and Pacific Islands people. Among other ethnic groups, when non-directed comments were included, other health conditions replaced lack of public awareness in the list of the 10 most frequent barriers.

Frequency of Barriers to Care

Comments were grouped into the 30 barriers to care identified in the qualitative study. Table 3 shows the

highest ranking barriers to care reported by each ethnic group. Although the frequencies were different between ethnic groups, the top 10 barriers were identical for Europeans and Maori. Ranking among Pacific Islands people were similar to Europeans, except for ranking physical access to the services ahead of public awareness. The other ethnic groups ranked language barriers as their most important barrier to care and also ranked other health conditions ahead of spiritual belief as a barrier to care, but otherwise reported similar ranking of barriers to Europeans and Maori.

Two lower ranked barriers to care were reported with significantly different frequencies between ethnic groups. Europeans were significantly less likely to report giving priority to others needs over their own in comparison with Maori, Pacific Islands people or others (0.9 %, 3.5 %, 3.9 %, 3.2 % respectively, $p < 0.05$). Maori were

Table 3. Most frequently reported barriers to diabetes care

Barrier	European <i>n</i> = 535	Maori <i>n</i> = 373	Pacific Is <i>n</i> = 597	Other <i>n</i> = 94	Significant difference
Precontemplative	19.6 % (1)	20.4 % (4)	29.1 % (1)	16.0 % (2)	0.001
Limited range of services	15.3 % (2)	22.0 % (2)	19.9 % (4)	13.8 % (3)	0.05
Not community based	12.9 % (3)	26.8 % (1)	24.8 % (2)	10.6 % (5)	0.001
Self factors – motivation	12.5 % (4)	13.4 % (7)	10.9 % (6)	6.4 % (10)	ns
Unsatisfactory education	12.3 % (5)	14.2 % (6)	14.6 % (5)	10.6 % (5)	ns
Diabetes knowledge	11.6 % (6)	15.0 % (5)	10.7 % (8)	11.7 % (4)	ns
Public awareness	11.2 % (7)	12.3 % (8)	7.7 %	6.4 % (10)	0.05
Community support	10.8 % (8)	11.5 % (9)	10.9 % (6)	7.4 % (9)	ns
Personal costs of care	10.7 % (9)	20.9 % (3)	21.9 % (3)	8.5 % (7)	0.001
Health belief spiritual	10.1 % (10)	11.0 % (10)	8.4 % (10)	5.3 %	ns
Other health conditions	6.5 %	6.2 %	6.4 %	7.4 % (8)	ns
Self factors – disempowered	6.4 %	10.2 %	7.7 %	5.3 %	ns
Physical access	4.1 %	6.7 %	9.2 % (9)	5.3 %	0.01
Communication – language	1.3 %	0.3 %	7.0 %	18.1 % (1)	0.001

Figures shown are crude/unadjusted % (rank: 10 most frequent barriers within each ethnic group only). Significance of the difference in the frequency of each barrier between ethnic groups is shown in the last column. Categorical variables are compared using χ^2 .

most likely to report that they preferred using alternative remedies (0.4 %, 4.0 %, 2.8 %, 0 %, respectively, $p < 0.001$).

Overall, there were no ethnic differences in internal physical (overall 9.6 %), educational (overall 12.9 %) or psycho-social (overall 32.8 %) barriers to care. However, external physical (32.1 %, 50.3 %, 47.9 %, 28.7 % respectively, $p < 0.001$) and psychological (49.1 %, 60.4 %, 58.6 %, 40.4 %, respectively, $p < 0.001$) barriers to care were more common among Polynesians.

Problems with personal finance, lack of community support, group pressure, and emotional barriers to care were reported more frequently with decreasing age. Conversely, spiritual and alternative health belief models and problems with language barriers increased with age. Respondents with longer diabetes duration were most likely to report problems with physical access to care and other health conditions. Those with a shorter duration of their diabetes were more likely to report a lack of knowledge of the diabetes services. There were no significant sex differences in barriers to care.

All barriers were entered as dependent variables into separate logistic regressions with age, diabetes duration, and sex as covariates. Ethnic group, current insulin treatment, benefit status and whether post-secondary school education served as either covariates or the independent variable. Table 4 shows the barriers with a significant relationship with each independent variable.

Discussion

Behavioural and psycho-social factors influence and determine the extent to which individuals are able to contribute to their own self-care.^{13,14} Previous studies have usually been qualitative in nature, have included mainly Caucasians with Type 1 diabetes mellitus, and often have focused on individual groups with particular

Table 4. Significant barriers to care in relation to insulin treatment, benefit status, educational status and ethnic group

Group	Odds ratio (95 % CI)
Insulin vs non Insulin treated (=1.0)	
Unsupportive macroenvironment	0.8 (0.6–1.0)
No physical symptoms	1.9 (1.4–2.3)
Unhelpful professionals in the past	0.8 (0.5–1.0)
Beneficiaries vs employed (=1.0)	
Physical access to care, including transportation	1.7 (1.4–2.0)
Unsupportive macroenvironment	0.8 (0.7–1.0)
Negative perceptions of time	0.4 (0.0–0.8)
Without vs with post-secondary school education (=1.0)	
Unsupportive macroenvironment	0.8 (0.6–1.0)
Lack of public awareness	0.7 (0.6–0.9)
Maori vs Europeans (=1.0)	
Alternative health belief	31.8 (3.1–60.5)
Pacific Is vs Europeans (=1.0)	
Personal finance	1.5 (1.0–2.0)
Precontemplative	1.6 (1.1–2.1)
Other ethnic groups vs Europeans (=1.0)	
Language	22.7 (12.3–33.1)
Lack of community based services	0.3 (–0.4–1.0)

Each barrier was entered as the dependent variable into logistic regressions with age, diabetes duration, sex, ethnic group, current insulin treatment, benefit status, and whether post-secondary school education was received, as covariates.

clinical or behavioural problems.¹³ Our study has used both qualitative and quantitative methods to investigate barriers to care in a large multiethnic population sample. We have attempted to amalgamate, for analytical pur-

poses, many of the barriers that hitherto have been considered separately.

The results were surprising in that, in spite of major differences in culture, acculturation, and socio-economic status, the top 10 barrier groupings were virtually the same for each ethnic group. Thus, perhaps many, or even all, of the barrier groupings identified represent universal aspects of living with diabetes that cross cultural and geopolitical boundaries. Nevertheless, while the broad group of barriers may be the same, their impact and the action needed for them to be overcome will often differ for different national, regional, ethnic and socio-economic groups. Interestingly, the need to tailor actions to overcome the barriers described here may also be of use for assessing and responding to individual patient needs, although this was not the original reason for the analysis.

The universality of many of the barriers described is reflected in the global drive to improve the processes of diabetes care. Development of guidelines, audit tools, outcome measures, minimum data sets and the introduction of information technology reflect growing attention to the need to systematically improve the delivery of diabetes care.^{15–19} Similarly, although our survey identified the need for greater community-based care (with walk-in facilities and minimal patient transportation needs), the need for greater local access to diabetes services is already being addressed elsewhere. For example, in the UK, access has been enhanced through community- rather than hospital-based clinics and this has been associated with greater patient attendance and satisfaction.²⁰ The need for greater local access to specialist services is also now being addressed among some HMOs in the USA.¹⁹

National and local policies relating to health services in general, particularly in relation to funding and organization, remain a key determinant of many of the 30 barrier groupings identified. Poor decisions by national and local administrators can create new barriers, while good decisions can remove or minimize existing barriers. For example, in New Zealand, modern health service planning has already identified the need for improvements in access to care through improved transportation, more flexible clinic hours, and child care facilities.²¹ Conversely, personal costs for diabetes services vary throughout New Zealand according to local policy. The difference in ranking of language as a barrier between Pacific Islands people and other groups of non-European ancestry probably reflects the impact of the local community diabetes educators from the Pacific Islands community, but it would have been helpful to have a more robust and prospective monitoring system.²²

We believe that the current framework of barriers to care will allow local groups systematically to identify and address the same 30 categories within their health care delivery systems. The framework complements the move to enhance the processes of diabetes care and has the potential to result in major improvements in diabetes

outcomes. Identification of the components within some of the barriers (particularly physical access) may require focus groups as we used in our anthropological survey. Local diabetes advisory councils may be needed to define co-ordination and organizational problems and their possible solutions.² Such councils need to include local political representatives, as well as patients and diabetes health workers. Similar national structures are already operating within Europe as part of the St Vincent movement.¹⁸ The ability to successfully address barriers needs to be carefully monitored.

Other advances in diabetes care are also being used to address some of the barriers described here. For example, aspects of the physical effects of treatment, such as needle phobia and impaired vision, have already resulted in the development of new devices to assist patient self-care. Methods for the delivery of diabetes education are continuously being refined and addressing barriers relating to failure to inform patients of the names, roles, and contact points of the diabetes team should be relatively simple. It is likely that the provision of such information will further empower patients, thereby promoting more timely referral to the physician, podiatrist, dietitian, diabetes educator, and others.

In spite of the advances in methods for overcoming educational, external and internal physical barriers, strategies for addressing the psychological and psychosocial barriers remain underdeveloped. While locus of control, self-efficacy, health belief models and similar belief-oriented concepts have frequently been described,^{23–25} few practical tools to assist clinicians have been introduced. Even the 'stages of change' model is not widely used as a means of steering the patient consultation.²⁶ Furthermore, there are few references to the other psychological barriers described here. For example, care providers need to identify and find ways of working with patients to address the low priority put on to personal health compared with the higher priority placed upon the needs of others (especially children) among older patients.

Foremost among motivational barriers were denial and 'laziness'. It is likely that denial accounts for some of the non-responding diabetic subjects and the results may understate motivational factors as a barrier. The asymptomatic though insidious nature of diabetes, especially Type 2 diabetes, poses motivational issues that are distinctive from diseases and illnesses with symptoms that cannot be ignored and which interfere with the performance of daily routines. Public ignorance regarding diabetes and a lack of environmental and social support for those with diabetes undermine individual motivation.

There are a number of caveats to the interpretation of the household survey data presented here. The use of open questions, which were intentionally brief and limited, could underestimate the number and importance of some barriers. Although interviewers were instructed to record all given comments, interviews were not taped

and hence there was the opportunity for interviewers to choose which comments were reported. It is likely that some barriers to care were omitted during the household survey. In particular, it is considered that language barriers placed some limitations on the range and depth of problems reported by members of the non-Polynesian, non-European ethnic groups. However, we feel that providing rapport was achieved, issues reported were ones that were materially and inherently important to the individual concerned. As the highest number of answers were obtained from Maori and Pacific Islands people, it is likely that these groups, which traditionally have poor participation rates, have expressed their major concerns more explicitly as a result of the technique employed. Misinterpretation through the use of English as a second language was minimized by the use of a multilingual team. In spite of these caveats, the validation methods for the coding system support the validity of the methods used.

In conclusion, we have developed and validated a structure to identify and respond to barriers to diabetes care in communities and in individuals. If valid elsewhere, with modification to suit the local context, the structure may assist in reducing the gap between clinical targets and clinical outcomes in diabetic patients.

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References

- King H, Gruber W, Lander T, eds. *Implementing National Diabetes Programs: Report of A WHO meeting*. Geneva: World Health Organization, 1995.
- Hiss RG. Barriers to care in non-insulin dependent diabetes mellitus: the Michigan experience. *Ann Intern Med* 1996; **124**: 146–148.
- Anderson RM, Herman WH, Davis JM, Freedman RP, Funnell MM, Neighbors HW. Barriers to improving diabetes care for blacks. *Diabetes Care* 1991; **14**: 605–609.
- Davidson JA. Diabetes care in minority groups: overcoming barriers to meet these patients' special needs. *Postgraduate Med* 1991; **90**: 153–167.
- Simmons D. Epidemiology of diabetes and its complications in New Zealand. *Diabetic Med* 1996; **13**: 371–375.
- Wilson P, Simmons D. The development of a community orientated plan for diabetes in South Auckland. *NZ Med J* 1994; **107**: 456–459.
- Simmons D, Fleming C, Voyle J, Fou F, Feo S, Gatland B. A pilot urban church-based programme to reduce risk factors for diabetes among Western Samoans in New Zealand. *Diabetic Med* 1998; **15**: 136–142.
- Simmons D, Gatland BA, Leakehe L, Fleming C. Frequency of diabetes in family members of diabetic probands. *J Int Med* 1995; **237**: 315–321.
- Simmons D, Gatland B, Leakehe L, Fleming C, Scragg R. Known diabetes in a multiethnic area. *NZ Med J* 1994; **107**: 219–222.
- Qualitative Solutions and Research. Solutions for Qualitative Analysis*. Melbourne, Australia: Replee Pty Ltd, La Trobe University, 1995.
- Bergner M, Rothman ML. Health status measures: an overview and guide for selection. *Ann Rev Publ Health* 1987; **8**: 191–210.
- Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977; **33**: 159–174.
- Rubin RR, Peyrot M. Psycho-social problems and interventions in diabetes: a review of the literature. *Diabetes Care* 1992; **15**: 1640–1657.
- Glasgow RE, Toobert DJ. Social environment and regimen adherence among Type 2 diabetic patients. *Diabetes Care* 1988; **11**: 377–386.
- Williams DRR, Home PD and members of a Working Group of the Research Unit of the Royal College of Physicians and the British Diabetic Association. A proposal for continuing audit of diabetes services. *Diabetic Med* 1992; **9**: 759–764.
- Busch-Sorensen M, Elphick AJ, Home PD, Thorsteinsson B. Diabetes care: a guideline to the facilities needed to support internationally endorsed standards. *Diabetic Med* 1995; **12**: 833–838.
- Vaughan NJA, Home PD (for the Diabetes Audit Working Group of the Research Unit of the Royal College of Physicians and the British Diabetic Association). The UK diabetes dataset: a standard for information exchange. *Diabetic Med* 1995; **12**: 717–722.
- Bergrem H, Kalo I, Babic D, Home PD, Staehr Johansen K. Diabetes care in Europe: The St Vincent Declaration coming of age? *Diab Nutr Metab* 1996; **9**: 330–336.
- Wagner EH. Population-based management of diabetes care. *Patient Educ and Counseling* 1995; **26**: 225–230.
- Day JL, Johnson P, Rayman G, Walker R. The feasibility of a potentially 'ideal' system of integrated diabetes care and education based on a day centre. *Diabetic Med* 1988; **5**: 70–75.
- Ministry of Health. *Policy Guidelines for Regional Health Authorities, 1996–97*. Wellington, New Zealand: Ministry of Health, 1996.
- Simmons D, Shaw LS, Kenealy T, Scott DJ, Scragg RK. Ethnic differences in diabetes knowledge and education: The South Auckland Diabetes Survey. *NZ Med J* 1994; **107**: 197–200.
- Beker MH, Janz NK. The health belief model applied to understanding diabetes regimen compliance. *Diabetes Educ* 1985; **12**: 41–46.
- Peyrot M, Rubin RR. Structure and correlates of diabetes specific locus of control. *Diabetes Care* 1994; **17**: 994–1001.
- Bandura A. Self efficacy mechanism in human agency. *American Psychologist* 1982; **37**: 122–147.
- Curry SJ. From research to practice: commentary. *Diabetes Spectrum* 1993; **6**: 34–35.